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PATENT
Attorney Docket No.: 90966-718527

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Confirmation No. 3893
Roger Stanley Bushby	Examiner: Kuang Y. Lin
Application No.: 10/599,765	Technology Center/Art Unit: 1793
Filed: November 17, 2006	APPELLANTS' BRIEF UNDER 37 CFR §41.37
For: LIQUID PRESSURE FORMING	

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Further to the Notice of Appeal mailed on March 21, 2011 for the above-referenced application, Appellants submit this Brief on Appeal.

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1. REAL PARTY IN INTEREST

The real party in interest is Composite Metal Technology Ltd.

2. RELATED APPEALS AND INTERFERENCES

No other appeals or interferences are known that will directly affect, are affected by, or have a bearing on the Board decision in this appeal.

3. STATUS OF CLAIMS

All pending claims 19, 21-24 and 31 stand rejected pursuant to a Final Office Action dated October 20, 2010 ("the Office Action"). The rejections of all pending claims are believed to be improper and are the subject of this appeal.

4. STATUS OF AMENDMENTS

No amendments have been filed subsequent to the Office Action.

5. SUMMARY OF CLAIMED SUBJECT MATTER

In the following summary, Appellants provide references to sections of the Specification and Drawings supporting the subject matter defined in the claims as required by 37 CFR 41.37. These references are intended to be illustrative in nature only.

Independent claim 19 is the sole independent claim. The claimed subject matter of claim 19 relates to a method of casting a component from a metal having a liquidus temperature. Claim 19 claims a step (a) of providing a die having a first part defining at least part of a die cavity with an external opening, and a second part defining a chamber for housing the first part, the chamber having an opening which is registrable with the external opening of the first part when housed in the second part (paragraphs 0014 and 0029 and Fig. 3, elements 102 and 108). In step (b) the first part of the die is heated to a temperature above the liquidus temperature of the metal whilst maintaining the second part of the die at a temperature below the liquidus temperature of the metal (paragraph 0030). In step (c), the first part of the die is placed in the chamber of the second part with the chamber opening registered with the external opening of the first part (paragraph 0030 and Fig. 3). In step (d), molten metal is introduced into the die cavity through the chamber opening (paragraph 0030). In step (e) molten metal is solidified in

the die cavity. In step (f), the first part of the die is removed from the second part after solidification, and the first part is cooled independently of the second part before removing the solidified component from the first part (paragraphs 0015 and 0030). In step (g), a third part is provided corresponding to the first part, and steps (b) to (e) are repeated with the third part in place of the first part, wherein molten metal is introduced into the third part whilst cooling the first part independently of the second part (paragraph 0015).

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The sole ground of rejection is the rejection of claims 19, 21-24 and 31 under 35 USC 103(a) as being unpatentable over Donomoto.

7. ARGUMENT

Independent claim 19 claims a method of casting a component from a metal having a liquidus temperature. Among the steps of the method is the step of utilizing a third part corresponding to the first part and repeating the steps b) to e) with the third part in place of the first part. In other words, the third part is heated, placed into the die chamber of the second part, and molten metal is introduced into the die cavity all while the first part is being cooled. In this way, molten metal is introduced into the third part (which is within the chamber of the second part) while cooling the first part independently of the second part.

In contrast to the method of claim 19, the Donomoto patent fails to teach the use of a first die cavity that is replaced with another die cavity while the first die cavity (which now contains a metal) cools. More specifically, the Donomoto patent describes a method of casting a metal base composite comprising a reinforcing material (e.g., alumina fibers) embedded in a metal matrix (e.g., aluminum alloy). A focus of the Donomoto patent is a sacrificial inner mold made from a water soluble salt with a high melting point (e.g., sodium chloride) which can be dissolved to release the metal base composite casting once solidified. To do so, the Donomoto reference describes the following steps:

1. A two-part die, comprising one part comprising a water soluble salt "retainer" 3, and the other part in the form of a casting mould 5 (see Figure 2).
2. Pre-heating the retainer 3 to 680°C.

3. Placing the retainer 3 in the casting mould 5, the interior of which has been kept at 300°C until the retainer 3 is installed.
4. Removing the salt "retainer" from the casting mould with a knock-out plunger after solidification of the metal alloy.

While Donomoto may describe the use of a "first part" (the salt "retainer") that is placed into a second part (the casting mould 5), nowhere in Donomoto are any of the other steps of claim 1 described. For example, Donomoto fails to disclose that the retainer is cooled independently of the casting mold before removing the solidified component from the retainer. Rather, it appears the Donomoto suggests letting both parts cool while the salt "retainer" remains within the mould. Indeed, Donomoto recites that "The molten metal is solidified in the mold to produce a formed product in which the reinforcing material and the metal are integrated." Col. 3, lines 28-31. Hence, claim 19 is distinguishable over Donomoto which fails to describe the feature of "cooling the first part independently of the second part before removing the solidified component from the first part."

Donomoto further fails to teach the additional step (g) where a third part corresponding to the first part is provided and repeating the steps (b) to (e) with the third part in place of the first part, wherein molten metal is introduced into the third part while cooling the first part independently of the second part. The Examiner agrees that Donomoto fails to teach this limitation, instead positing that while Donomoto does not "show to provide a third part corresponding to the first part for repeating the casting steps as claimed in the last step of claim 19," it would be obvious to do so because the water soluble salt used for the retainer can be reused. More specifically, the Office Action recites that, "it would have been obvious to provide a plurality of retainers for a close loop die casting operation by continuously recycling the salt and then use the recycled salt to make retainers for sequentially casting the composite articles."

The mere fact that salt can be recycled to make new retainers in no way suggests the limitation of claim 19 of "providing a third part corresponding to the first part and repeating the steps (b) to (e) with the third part in place of the first part, wherein molten metal is introduced into the third part whilst cooling the first part independently of the second part." (emphasis added).

The examiner's conclusion to perform the steps of claim 19 based on the recycle-ability of one part is illogical. The fact that a mold can be recycled is irrelevant as to whether another

part is used to hold the second part while the first part independently cools. In other words, recycle-ability has nothing to do with this limitation. The mere fact that multiple similar parts exist (or can be made to exist) is irrelevant as to how they are used, regardless of whether or not they can be recycled. In short, the Donomoto reference simply fails to teach this claim limitation, and the examiner's conclusion is nothing more than an unsupported statement that it would be obvious to perform this step based, not on any art, but from the present application.

One significant advantage of removing the solidified component from the first part and using a third part corresponding to the first part to cast a component while the first part cools independently of the second part is that this process enables fast casting cycle times. At the same time, this process ensures that cast component quality is not prejudiced by premature stripping from the first die.

In contrast, the Donomoto reference fails to teach the reusing of the casting mold with a new retainer in order to achieve fast cycling times. While the casting mold of the Donomoto reference may be reused with a new retainer, there is no suggestion or teaching of so doing by removing the original retainer from the casting mold and cooling the retainer independently of the casting mold before removing the solidified component from the retainer, as well as to repeat the casting process with the new retainer while cooling the (original) retainer independently of the casting mold.

Hence, for at least these reasons independent claim 19 is distinguishable, and the section 103 rejection is improper.

Claim 31 depends from claim 19 which is distinguishable over Donomoto for at least the reasons previously described. Moreover, there is no rational expectation for one of skill in the art to combine the teachings of JP 62-72,756 with that of the Donomoto reference. More specifically, Donomoto teaches the use of a salt retainer that is dissolved to remove it. Why would one of skill in the art split a salt retainer when the sole reason for using salt is to allow it to be dissolved? Hence, claim 31 is distinguishable for this additional reason.

8. CONCLUSION

For these reasons, it is respectfully submitted that the rejection should be reversed.

Respectfully submitted,

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9. CLAIMS APPENDIX

Claims 1-18 (Cancelled).

19. (Previously presented) A method of casting a component from a metal having a liquidus temperature, comprising the steps of:

a) providing a die comprising: a first part defining at least part of a die cavity with an external opening; and a second part defining a chamber for housing the first part, the chamber having an opening which is registrable with the external opening of the first part when housed in the second part;

b) heating the first part of the die to a temperature above the liquidus temperature of the metal whilst maintaining the second part of the die at a temperature below the liquidus temperature of the metal;

c) placing the first part of the die in the chamber of the second part with the chamber opening registered with the external opening of the first part;

d) introducing molten metal into the die cavity through the chamber opening;

e) solidifying molten metal in the die cavity;

f) removing the first part of the die from the second part after solidification, and cooling the first part independently of the second part before removing the solidified component from the first part; and

g) providing a third part corresponding to the first part and repeating the steps (b) to (e) with the third part in place of the first part, wherein molten metal is introduced into the third part whilst cooling the first part independently of the second part.

Claim 20 (Cancelled).

21. (Previously presented) A method according to claim 19, further comprising:

placing a fibre preform into the die cavity prior to introducing molten metal therein; and

applying with a mechanical compaction piston pressure direct to molten metal introduced into the die cavity to encourage infiltration of the fibre preform prior to solidification.

22. (Previously presented) A method according to claim 21, further comprising advancing the mechanical compaction piston towards the die cavity when applying pressure to molten metal in the die cavity.

23. (Previously presented) A method according to claim 22, in which the mechanical compaction piston projects into the die cavity when applying pressure to molten metal in the die cavity.

24. (Previously presented) A method according to claim 21, further comprising applying pressures in the range 400 bar to 2500 bar to molten metal in the die cavity during solidification using the mechanical compaction piston.

Claims 25-30 (Cancelled).

31. (Previously presented) A method according to claim 19, in which the first and second parts of the die provided each comprise at least two sections so that each part may be split open, the method comprising placing the first part in the second part so that sections of one part are configured to separate in a different direction to sections of the other part.

10. EVIDENCE APPENDIX

None.

11. RELATED PROCEEDINGS APPENDIX

None.